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PATENT
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APPLICANT(S): Nicholas R. Bachur, Jr. et al.

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EXAMINER: W. Beisner

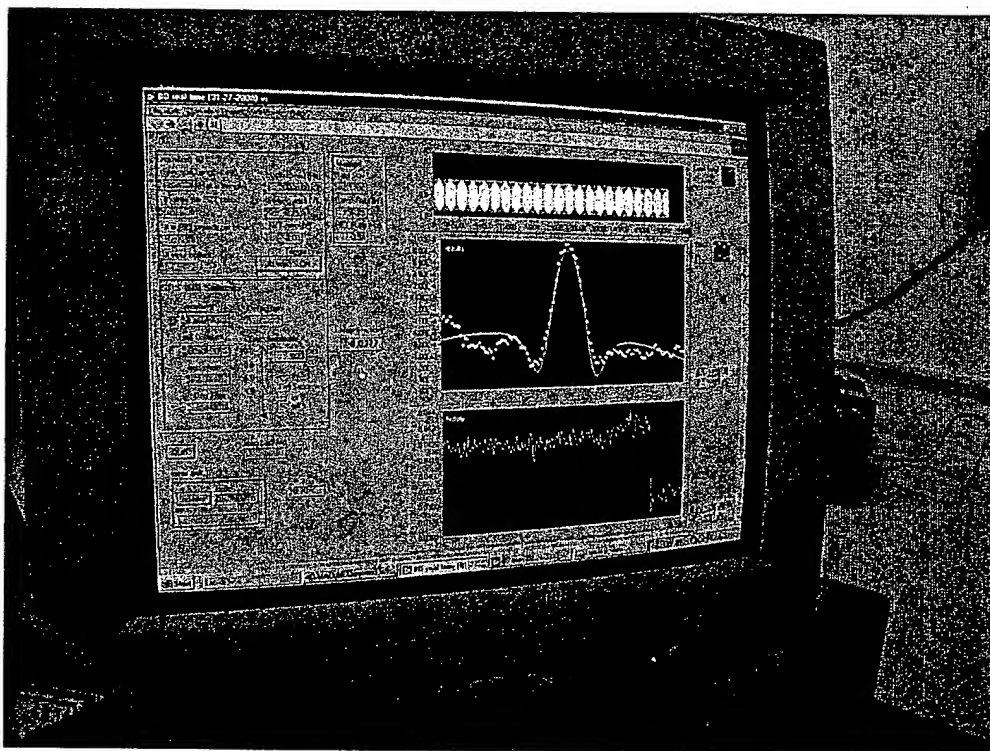
FOR: System and Method for Optically Monitoring the Concentration of a Gas, or the Pressure in a Sample Vial to Detect Sample Growth.

Commissioner of Patents
P.O. Box 1450
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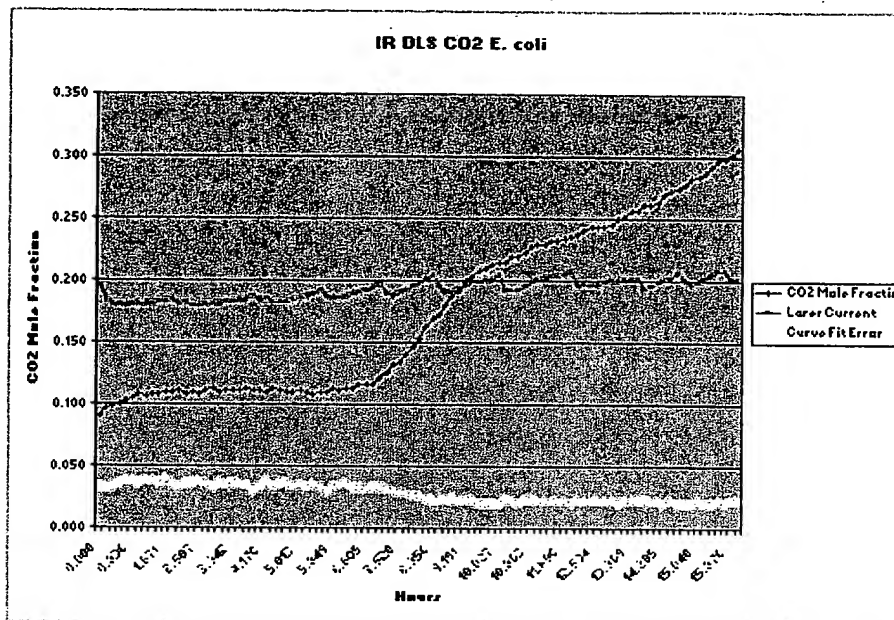
DECLARATION UNDER 37 C.F.R. § 1.131

1. We, the undersigned, are inventors on the above-captioned patent application.
2. Prior to July 13, 2000, we reduced to practice, in the United States, a system for detecting growth of microorganisms in a sample in a container, the system having: a plurality of containers, a module having a plurality of openings for receiving the containers, a tunable laser configured to emit a beam through at least one container, a detector for detecting the light passing through the container, and a signal analyzer for analyzing the detected light. All experiments described herein were performed prior to July 13, 2000, in the United States.
3. The BD BACTEC 9050 is an instrument for determining microbial growth in sample containers, and contains a circular panel for holding multiple containers. We modified a BD BACTEC 9050 by providing a tunable laser and a photodiode, with the tunable laser configured to emit a beam through a container, and the photodiode configured to detect the light passing through the container. See Figures 1-3 below, which show various experimental configurations of the modified BACTEC 9050. Figure 1 shows a close up of a laser and detector with a single container. Figures 2 and 3 show configurations with multiple containers, and also showing a laser and detector.

4. A laser utilized with the modified BACTEC 9050 was a distributed feedback InGaAsP laser from Sensor Unlimited.
5. The photodetector that received the laser light after passing through a BACTEC bottle was a Fermionics FD1000W2.2 InGaAs photodiode.
6. A PC was used to control the laser, and to acquire and analyze the data from the photodiode. LabView software was used in conjunction with a National Instruments PCI-NIO-16E-1 data acquisition board. Data files were analyzed using a MATLAB programming environment. The center graph on LabView virtual instrument below shows the "2f" curve representing absorbance of gas in a BACTEC bottle tested. The amplitude of the center peak is proportional to the concentration of gas in the bottle. The width of the same peak is proportional to the pressure of the gas.



7. One example of data generated from the modified BACTEC 9050 is shown below.



This graph is an output of the BACTEC 9050 Breadboard showing increasing CO₂ Mole Fraction produced as a BACTEC bottle, inoculated with an E. coli culture, grew overnight. The increasing dark blue line indicates a positive culture.

8. We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment or both, under 18 U.S.C. 1001, and that such willful false statements may jeopardize the validity of this application, any patent issuing thereon, or any patent to which this Declaration directed.

21/MAR/06

Date

Nicholas R. Bachur Jr.

Nicholas R. Bachur Jr.

21/Mar/06

Date

Patrick S. Beaty

Patrick S. Beaty

03/21/2006

Date

Timothy G. Foley

Timothy G. Foley

Fig. 1

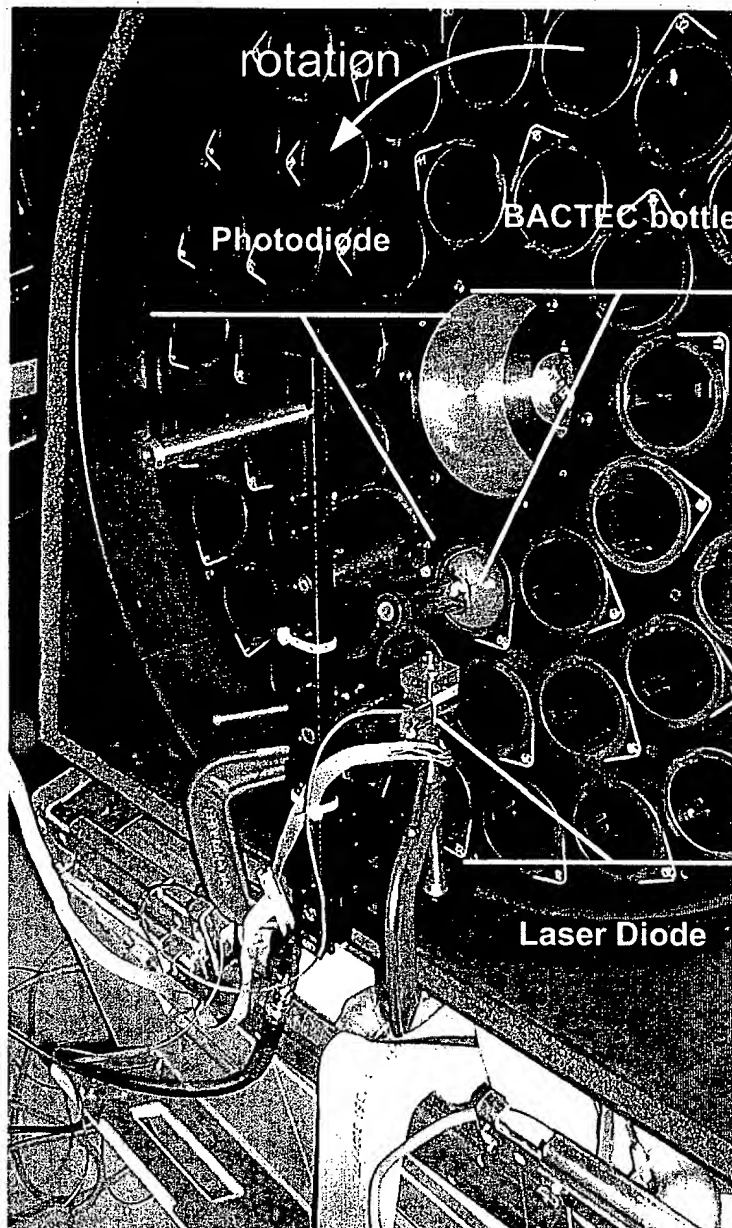


Fig. 2

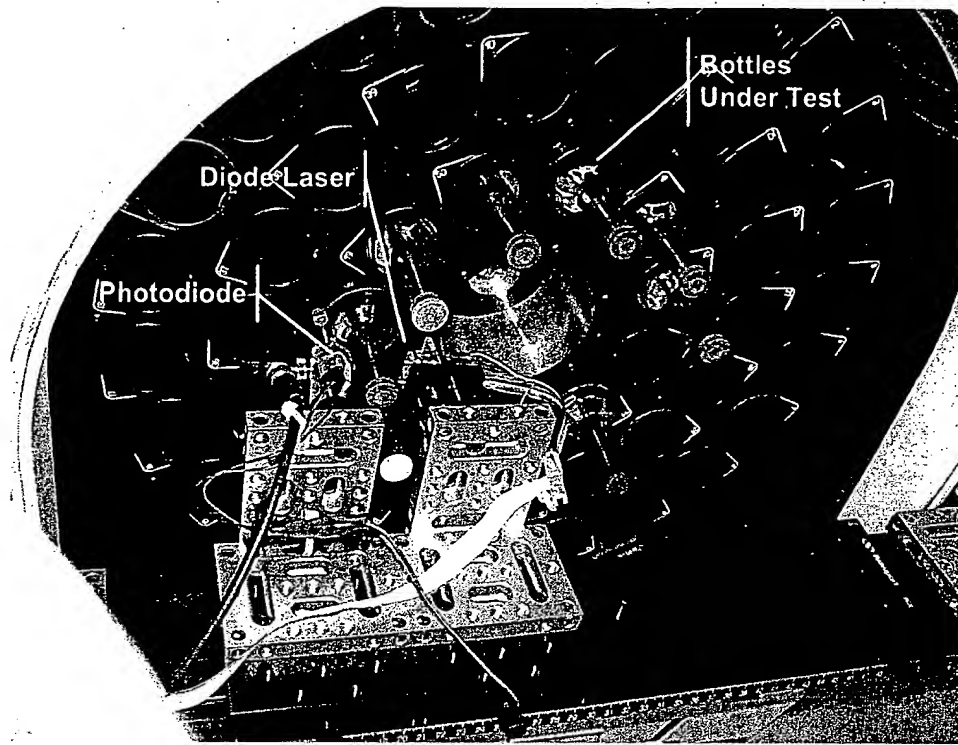


Fig. 3

